



# *United Kingdom of Great Britain and Northern Ireland*

---

## EDICT OF GOVERNMENT

In order to promote public education and public safety, equal justice for all, a better informed citizenry, the rule of law, world trade and world peace, this legal document is hereby made available on a noncommercial basis, as it is the right of all humans to know and speak the laws that govern them.

BS NA EN 1999-1-3 (2011) (English): UK National  
Annex to Eurocode 9. Design of aluminium  
structures. Structures susceptible to fatigue

---

*Nulli vendemus, nulli negabimus aut differemus Rectum aut Justiciam.*  
*We will sell to no man, we will not deny or defer to any man either Justice or Right.*  
MAGNA CARTA (1297)

BLANK PAGE



**NA to BS EN 1999-1-3:2007+A1:2011**

*Incorporating National Amendment No. 1*



**BSI Standards Publication**

**UK National Annex to  
Eurocode 9: Design of  
aluminium structures –  
Part 1-3: Structures susceptible  
to fatigue**

NO COPYING WITHOUT BSI PERMISSION EXCEPT AS PERMITTED BY COPYRIGHT LAW

*raising standards worldwide™*



**FSC****100%**

From well-managed forests

Cert no. SW-COC-004238

www.fsc.org

© 1996 Forest Stewardship Council

## Publishing and copyright information

The BSI copyright notice displayed in this document indicates when the document was last issued.

© The British Standards Institution 2012

Published by BSI Standards Limited 2012

ISBN 978 0 580 78354 8

ICS 77.150.10, 91.010.30, 91.080.10

The following BSI references relate to the work on this standard:

Committee reference B/525/9

Draft for comment 08/30129903 DC, 12/30260367 DC

## Publication history

First published November 2008

## Amendments issued since publication

Amd. No.	Date	Text affected
A1	July 2012	Table NA.1 and Table NA.2. See tagged text.

## Contents

Introduction 1

**NA.1** Scope 1

**NA.2** Nationally Determined Parameters 1

**NA.3** Decisions on the status of informative annexes 5

**NA.4** References to non-contradictory complementary information 5

Bibliography 6

### List of tables

Table NA.1 – UK values for Nationally Determined Parameters described in BS EN 1999-1-3:2007+A1 2

Table NA.2 – UK decisions on the status of informative annexes in BS EN 1999-1-3:2007+A1 5

### Summary of pages

This document comprises a front cover, an inside front cover, pages i to ii, pages 1 to 6, an inside back cover and a back cover.



# National Annex (informative) to BS EN 1999-1-3:2007+A1:2011, Eurocode 9: Design of aluminium structures – Part 1-3: Structures susceptible to fatigue

## Introduction

This National Annex is published by BSI Standards Limited, under licence from The British Standards Institution.

This National Annex has been prepared by BSI Subcommittee, B/525/9, *Structural use of aluminium*. In the UK it is to be used in conjunction with BS EN 1999-1-3:2007+A1, *Structures susceptible to fatigue*.

The start and finish of text introduced or altered by National Amendment No. 1 is indicated in the text by tags  $\boxed{A_1}$   $\langle A_1 \rangle$ . Minor editorial changes are not tagged.

National Amendment No. 1 has been made to reflect Amendment No. 1 to BS EN 1999-1-3:2007.

## NA.1 Scope

This National Annex gives:

- a) the UK decisions for the Nationally Determined Parameters described in the following subclauses of BS EN 1999-1-3:2007+A1:
 

— 2.1.1(1)	— 5.8.1(1)	— $\boxed{A_1}$ Text deleted $\langle A_1 \rangle$
— $\boxed{A_1}$ 2.2.1(4) $\langle A_1 \rangle$	— 5.8.2(1)	— E(5)
— $\boxed{A_1}$ 2.3.1(2) $\langle A_1 \rangle$	— 6.1.3(1)	— E(7)
— 2.3.2(6)	— 6.2.1(2)	— I.2.2(1)
— 2.4(1)	— 6.2.1(7)	— I.2.3.2(1)
— 3(1)	— 6.2.1(11)	— I.2.4(1)
— 4(2)	— $\boxed{A_1}$ Text deleted $\langle A_1 \rangle$	
- b) the UK decisions on the status of BS EN 1999-1-3:2007+A1 informative annexes; and
- c) references to non-contradictory complementary information.

## NA.2 Nationally Determined Parameters

UK decisions for the Nationally Determined Parameters described in BS EN 1999-1-3:2007+A1 are given in Table NA.1.

Table NA.1 UK values for Nationally Determined Parameters described in BS EN 1999-1-3:2007+A1

Subclause	Nationally Determined Parameter	Eurocode recommendation	UK decision
<b>2.1.1(1)</b>	Conditions for the application of the safe life and damage tolerant design methods	[None]	Safe life design should be used wherever possible.  Damage tolerant design may only be used with the agreement of the client.  It is recommended that damage tolerant design is not used for structures that are classified as consequence class CC3 according to BS EN 1990:2002.  If damage tolerant design is used, conditions a) to d) of <b>A.3.1</b> for the application of damage tolerant design should apply. <b>A1</b>
<b>2.2.1(4)</b> <b>A1</b>	Value of safe life design damage limit $D_{lim}$	$D_{lim} = 1,0$	Use the recommended value.
<b>2.3.1(2)</b> <b>A1</b>	Rules for the determination of fatigue loading not covered by a European standard	[None]	European standards give data for most applications and procedures. No further data are currently available. When available, data will be included in PD 6702-1.
<b>2.3.2(6)</b>	Numbers of standard deviations to be used in deriving the confidence limit for the design load spectrum	$k_F = k_N = 2$	Use the recommended values.
<b>2.4(1)</b>	Partial factors to be used for fatigue loads	$\gamma_{FF} = 1,0$ when normal confidence limits are used. Values given in Table 2.1 for other confidence limits	Use the recommended values.
<b>3(1)</b>	Fatigue data for certain low strength alloys listed in BS EN 1999-1-1:2007 (EN AW-3005, EN AW-3103, EN AW-5005, and EN AW-8011A in all tempers and EN AW-6060 in temper T5)	[None]	No data are currently available. When available, data will be included in PD 6702-1.
<b>4(2)</b>	Information on fatigue strength data and durability under aggressive exposure conditions, based on local exposure conditions	[None]	No data are currently available. When available, data will be included in PD 6702-1.



Table NA.1 UK values for Nationally Determined Parameters described in BS EN 1999-1-3:2007+A1 (continued)

Subclause	Nationally Determined Parameter	Eurocode recommendation	UK decision
5.8.1(1)	Information on the use of nominal stress ranges or modified nominal stress ranges for standardized fatigue loads	[None]	No data are currently available. When available, data will be included in PD 6702-1.
5.8.2(1)	Information for determining the design value of nominal stress ranges, where no appropriate data are available for damage equivalent factors	[None]	Use the recommendations in PD 6702-1. <i>NOTE The simplified approaches given in parts of BS EN 1991 (e.g. for cranes) are not valid for aluminium as they are based on S-N slope <math>m=3</math> for normal stress and <math>m=5</math> for shear stress.</i>
6.1.3(1)	A set of detail categories and constructional details, together with a set of consistence criteria for such members, taking the provisions in 6.1.2 and 6.3 into account	Detail categories in Annex J	Use the tables in PD 6702-1 in place of Annex J.
	Constructional details not covered by Annex J	[None]	
<b>A1</b> 6.2.1(2)	Value of partial factor for uncertainties in materials and execution (specific constructional detail types)	Use values in L.4 if Annex J is used	Use value of $\gamma_{Mf} = 1,0$ in conjunction with the constructional detail types given in PD 6702-1, not those in L.4. <b>A1</b>
6.2.1(7)	Additional provisions for fatigue design for endurance in the range below $10^5$ cycles	Guidance in Annex F	Use the recommendations given in PD 6702-1.
6.2.1(11)	Detail type and thickness range for which an increase in the fatigue stress value may be permitted, as well as the number of categories	The increase in number of categories should not exceed 2	Use the recommendations given in PD 6702-1.
<b>A1</b> Text deleted <b>A1</b>			
<b>A1</b> Text deleted <b>A1</b>			
E(5)	Partial factor for design strength values for adhesively bonded joints (specific constructional detail types)	$\gamma_{Mf} = 3,0$	Use the recommended value.
E(7)	Temperature limits for adhesively bonded joint fatigue data (when justified by test according to Annex C)	$-20\text{ }^{\circ}\text{C}$ and $+60\text{ }^{\circ}\text{C}$	Use the recommended values.

Table NA.1 UK values for Nationally Determined Parameters described in BS EN 1999-1-3:2007+A1 (*continued*)

Subclause	Nationally Determined Parameter	Eurocode recommendation	UK decision
I.2.2(1)	Fatigue strength values for welded joints of castings	[None]	No data are currently available. When available, data will be included in PD 6702-1.
I.2.3.2(1)	Fatigue strength values for pinned joints of castings	[None]	No data are currently available. When available, data will be included in PD 6702-1.
I.2.4(1)	Fatigue strength values for adhesively bonded joints in castings	[None]	No data are currently available. When available, data will be included in PD 6702-1.

### NA.3 Decisions on the status of informative annexes

UK decisions on the status of informative annexes in BS EN 1999-1-3:2007+A1 are given in Table NA.2.

Table NA.2 UK decisions on the status of informative annexes in BS EN 1999-1-3:2007+A1

Annex	Description	UK decision
Annex B	Guidance on assessment of crack growth by fracture mechanics	May be used
Annex C	Testing for fatigue design	Recommended
Annex D	Stress analysis	Recommended
Annex E	Adhesively bonded joints	May be used
Annex F	Low cycle fatigue range	Not recommended – see PD 6702-1
Annex G	Influence of R-ratio	May be used
Annex H	Fatigue strength improvement of welds	May be used
Annex I	Castings	May be used
Annex J	Detail category tables	Ⓐ Not recommended – PD 6702-1 provides alternative detail category tables that are acceptable for use in the UK Ⓐ
Annex K	Hot spot reference detail method	Ⓐ Not recommended – PD 6702-1 provides an alternative hot spot method that is acceptable for use in the UK Ⓐ
Ⓐ Annex L	Guidance on use of design methods, selection of partial factors, limits for damage values, inspection intervals and execution parameters when Annex J is adopted	Not recommended – PD 6702-1 provides alternative guidance that is acceptable for use in the UK Ⓐ

### NA.4 References to non-contradictory complementary information

The following references contain non-contradictory complementary information for use with BS EN 1999-1-3.

PD 6702-1, *Recommendations for the design of aluminium structures to BS EN 1999*

PD 6705-3, *Recommendations for the execution of aluminium structures to BS EN 1090-3*

## Bibliography

### Standards publications

For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS EN 1990:2002, *Eurocode 0 – Basis of structural design*

BS EN 1991 (all parts), *Eurocode 1: Actions on structures*

BS EN 1999-1-1:2007, *Eurocode 9: Design of aluminium structures – Part 1-1: General*

PD 6702-1, *Recommendations for the design of aluminium structures to BS EN 1999*

PD 6705-3, *Recommendations for the execution of aluminium structures to BS EN 1090-3*



# British Standards Institution (BSI)

BSI is the independent national body responsible for preparing British Standards and other standards-related publications, information and services. It presents the UK view on standards in Europe and at the international level.

BSI is incorporated by Royal Charter. British Standards and other standardisation products are published by BSI Standards Limited.

## Revisions

British Standards and PASs are periodically updated by amendment or revision. Users of British Standards and PASs should make sure that they possess the latest amendments or editions.

It is the constant aim of BSI to improve the quality of our products and services. We would be grateful if anyone finding an inaccuracy or ambiguity while using British Standards would inform the Secretary of the technical committee responsible, the identity of which can be found on the inside front cover. Similar for PASs, please notify BSI Customer Services.

**Tel: +44 (0)20 8996 9001 Fax: +44 (0)20 8996 7001**

BSI offers BSI Subscribing Members an individual updating service called PLUS which ensures that subscribers automatically receive the latest editions of British Standards and PASs.

**Tel: +44 (0)20 8996 7669 Fax: +44 (0)20 8996 7001**  
**Email: [plus@bsigroup.com](mailto:plus@bsigroup.com)**

## Buying standards

You may buy PDF and hard copy versions of standards directly using a credit card from the BSI Shop on the website **[www.bsigroup.com/shop](http://www.bsigroup.com/shop)**. In addition all orders for BSI, international and foreign standards publications can be addressed to BSI Customer Services.

**Tel: +44 (0)20 8996 9001 Fax: +44 (0)20 8996 7001**  
**Email: [orders@bsigroup.com](mailto:orders@bsigroup.com)**

In response to orders for international standards, BSI will supply the British Standard implementation of the relevant international standard, unless otherwise requested.

## Information on standards

BSI provides a wide range of information on national, European and international standards through its Knowledge Centre.

**Tel: +44 (0)20 8996 7004 Fax: +44 (0)20 8996 7005**  
**Email: [knowledgecentre@bsigroup.com](mailto:knowledgecentre@bsigroup.com)**

BSI Subscribing Members are kept up to date with standards developments and receive substantial discounts on the purchase price of standards. For details of these and other benefits contact Membership Administration.

**Tel: +44 (0)20 8996 7002 Fax: +44 (0)20 8996 7001**  
**Email: [membership@bsigroup.com](mailto:membership@bsigroup.com)**

Information regarding online access to British Standards and PASs via British Standards Online can be found at **[www.bsigroup.com/BSOL](http://www.bsigroup.com/BSOL)**

Further information about British Standards is available on the BSI website at **[www.bsi-group.com/standards](http://www.bsi-group.com/standards)**

## Copyright

All the data, software and documentation set out in all British Standards and other BSI publications are the property of and copyrighted by BSI, or some person or entity that own copyright in the information used (such as the international standardisation bodies) has formally licensed such information to BSI for commercial publication and use. Except as permitted under the Copyright, Designs and Patents Act 1988 no extract may be reproduced, stored in a retrieval system or transmitted in any form or by any means – electronic, photocopying, recording or otherwise – without prior written permission from BSI. This does not preclude the free use, in the course of implementing the standard, of necessary details such as symbols, and size, type or grade designations. If these details are to be used for any other purpose than implementation then the prior written permission of BSI must be obtained. Details and advice can be obtained from the Copyright & Licensing Department.

**Tel: +44 (0)20 8996 7070**  
**Email: [copyright@bsigroup.com](mailto:copyright@bsigroup.com)**

## BSI

389 Chiswick High Road London W4 4AL UK

Tel +44 (0)20 8996 9001

Fax +44 (0)20 8996 7001

[www.bsigroup.com/standards](http://www.bsigroup.com/standards)